SEQUENCE LISTING

<110> STOCKER, PENNY J.
      STEIMEL-CRESPI, DOROTHY T.
      CRESPI, CHARLES L.

<120> P-GLYCOPROTEINS AND USES THEREOF

<130> G00307.70020.US

<150> US 60/156,921
<151> 1999-09-28

<150> US 60/158,818
<151> 1999-10-12

<150> US 09/672,810
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gac cgc aat gga gga gca gag aag aag aac ttt ttt aaa ctg aac aat   162
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aaa agt aaa aaa gat aag aag gaa agg aaa cca act gtc agt gta ttt   210
Lys Ser Lys Lys Asp Lys Lys Glu Arg Lys Pro Thr Val Ser Val Phe
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tca atg ttt cgc tat tca aat tgg ctt gac aag ttg tat atg gtg gtg   258
Ser Met Phe Arg Tyr Ser Asn Trp Leu Asp Lys Leu Tyr Met Val Val
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gga act ttg gct gcc atc atc cat gga gct gga ctt cct ctc atg atg   306
Gly Thr Leu Ala Ala Ile Ile His Gly Ala Gly Leu Pro Leu Met Met
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ctg gtg ttt gga gac atg acg gat acc ttt gca aat gca gga aat tta   354
Leu Val Phe Gly Asp Met Thr Asp Thr Phe Ala Asn Ala Gly Asn Leu
70   75   80   85

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gga gat tta gga gct ctg ttg act aat agc agt aat atc act gat aca      402
Gly Asp Leu Gly Ala Leu Leu Thr Asn Ser Ser Asn Ile Thr Asp Thr
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gtg ccc gtc atg aat ctg gag gaa gat atg acc agg tat gcc tat tat      450
Val Pro Val Met Asn Leu Glu Glu Asp Met Thr Arg Tyr Ala Tyr Tyr
             105             110             115

tac agt gga att ggt gct ggg gtg ctg gtt gct gct tac att cag gtt      498
Tyr Ser Gly Ile Gly Ala Gly Val Leu Val Ala Ala Tyr Ile Gln Val
             120             125             130

tca ttt tgg tgc ctg gca gct gga aga caa ata cac aaa att aga aaa      546
Ser Phe Trp Cys Leu Ala Ala Gly Arg Gln Ile His Lys Ile Arg Lys
             135             140             145

cag ttt ttt cat gct ata atg cga cag gag ata ggc tgg ttt gat gtg      594
Gln Phe Phe His Ala Ile Met Arg Gln Glu Ile Gly Trp Phe Asp Val
150              155             160             165

cac gat gtt ggg gag ctt aac acc cgg ctt aca gat gat gtc tcc aag      642
His Asp Val Gly Glu Leu Asn Thr Arg Leu Thr Asp Asp Val Ser Lys
             170             175             180

att aat gaa gga att ggt gac aaa att gga atg ttc ttt cag tca atg      690
Ile Asn Glu Gly Ile Gly Asp Lys Ile Gly Met Phe Phe Gln Ser Met
             185             190             195

gca aca ttt ttc act ggg ttt ata gta gga ttt aca cgt ggt tgg aag      738
Ala Thr Phe Phe Thr Gly Phe Ile Val Gly Phe Thr Arg Gly Trp Lys
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cta acc ctt gtg att ttg gcc atc agt cct gtt ctt gga ctg tca gct      786
Leu Thr Leu Val Ile Leu Ala Ile Ser Pro Val Leu Gly Leu Ser Ala
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gca gtc tgg gca aag ata ctg tct tca ttt act gat aaa gaa ctc tta      834
Ala Val Trp Ala Lys Ile Leu Ser Ser Phe Thr Asp Lys Glu Leu Leu
230              235             240             245

gct tat gca aaa gct gga gca gta gct gaa gag gtc ttg gca gca att      882
Ala Tyr Ala Lys Ala Gly Ala Val Ala Glu Glu Val Leu Ala Ala Ile
             250             255             260

aga act gtg att gca ttt gga gga caa aag aaa gaa ctc gaa agg tac      930
Arg Thr Val Ile Ala Phe Gly Gly Gln Lys Lys Glu Leu Glu Arg Tyr
             265             270             275

aac aaa aat tta gaa gaa gct aaa aga att ggg ata aag aaa gct att      978
Asn Lys Asn Leu Glu Glu Ala Lys Arg Ile Gly Ile Lys Lys Ala Ile
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aca gcc aat att tct ata ggt gct gct ttc ctg ctt atc tat gca tct     1026
Thr Ala Asn Ile Ser Ile Gly Ala Ala Phe Leu Leu Ile Tyr Ala Ser
             295             300             305

tat gct ctg gcc ttc tgg tat ggg acc acc ttg gtc ctc tca aag gaa     1074
Tyr Ala Leu Ala Phe Trp Tyr Gly Thr Thr Leu Val Leu Ser Lys Glu
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      Tyr Ser Ile Gly Gln Val Leu Thr Val Phe Phe Ser Val Leu Ile Gly
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      gct ttt agt gtt gga cag gca tct cca agc att gaa gca ttt gca aat    1170
      Ala Phe Ser Val Gly Gln Ala Ser Pro Ser Ile Glu Ala Phe Ala Asn
                      345                 350                 355

      gca aga gga gca gct ttt gaa atc ttc aag ata att gat aat aag cca    1218
      Ala Arg Gly Ala Ala Phe Glu Ile Phe Lys Ile Ile Asp Asn Lys Pro
                      360                 365                 370

      agt att gac agc tat tcg aag agt ggg cac aaa cca gat aat att aag    1266
      Ser Ile Asp Ser Tyr Ser Lys Ser Gly His Lys Pro Asp Asn Ile Lys
                      375                 380                 385

      gga aat ttg gaa ttc aga aat gtt cac ttc agt tac cca tct cga aaa    1314
      Gly Asn Leu Glu Phe Arg Asn Val His Phe Ser Tyr Pro Ser Arg Lys
      390                 395                 400                 405

      gaa gtt aag atc ttg aag ggc ctg aac ctg aag gtg cag agt ggg cag    1362
      Glu Val Lys Ile Leu Lys Gly Leu Asn Leu Lys Val Gln Ser Gly Gln
                      410                 415                 420

      acg gtg gcc ctg gtt gga aac agc ggc tgt ggg aag agc aca acg gtc    1410
      Thr Val Ala Leu Val Gly Asn Ser Gly Cys Gly Lys Ser Thr Thr Val
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      cag ctg atg cag agg ctt tat gac ccc aca gag ggc atg gtc agt gtt    1458
      Gln Leu Met Gln Arg Leu Tyr Asp Pro Thr Glu Gly Met Val Ser Val
                      440                 445                 450

      gat gga cag gat att agg acc ata aac gta agg ttt cta cgg gaa atc    1506
      Asp Gly Gln Asp Ile Arg Thr Ile Asn Val Arg Phe Leu Arg Glu Ile
                      455                 460                 465

      atc ggt gtg gtg agt cag gaa cct gta ttg ttt gcc acc acg ata gct    1554
      Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe Ala Thr Thr Ile Ala
      470                 475                 480                 485

      gaa aac att cgc tat ggt cgt gaa gat gtc acc atg gat gag att gag    1602
      Glu Asn Ile Arg Tyr Gly Arg Glu Asp Val Thr Met Asp Glu Ile Glu
                      490                 495                 500

      aaa gct gtc aag gaa gcc aat gcc tat gac ttt atc atg aaa ctg cct    1650
      Lys Ala Val Lys Glu Ala Asn Ala Tyr Asp Phe Ile Met Lys Leu Pro
                      505                 510                 515

      cag aaa ttt gac acc ctg gtt gga gag aga ggg gcc cag ctg agt ggt    1698
      Gln Lys Phe Asp Thr Leu Val Gly Glu Arg Gly Ala Gln Leu Ser Gly
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      ggg cag aag cag agg atc gcc att gca cgt gcc ctg gtt cgc aac ccc    1746
      Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Asn Pro
                      535                 540                 545

      aag atc ctc ctg ctg gac gag gcc acg tca gcc ttg gac aca gaa agt    1794
      Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser
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gaa gca gtg gtt cag gtg gct ctg gat aag gcc aga aaa ggt cgg acc        1842
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acc att gtg ata gct cat cgt ttg tct acg gtt cgt aat gcc gac gtc        1890
Thr Ile Val Ile Ala His Arg Leu Ser Thr Val Arg Asn Ala Asp Val
            585             590             595

atc gct ggt ttc gat gat gga gtc att gtg gag aaa gga aat cat gat        1938
Ile Ala Gly Phe Asp Asp Gly Val Ile Val Glu Lys Gly Asn His Asp
            600             605             610

gag ctc atg aaa gag aaa ggc att tac ttc aaa ctt gtc aca atg cag        1986
Glu Leu Met Lys Glu Lys Gly Ile Tyr Phe Lys Leu Val Thr Met Gln
            615             620             625

aca gca gga aat gaa att gaa tta gaa aat gca gct gat gaa tcc aaa        2034
Thr Ala Gly Asn Glu Ile Glu Leu Glu Asn Ala Ala Asp Glu Ser Lys
630             635             640             645

agt gaa att gat acc ttg gaa atg tct tca cat gat tca gga tcc agt        2082
Ser Glu Ile Asp Thr Leu Glu Met Ser Ser His Asp Ser Gly Ser Ser
            650             655             660

cta ata aga aaa aga tcc act cgt agg agt gtc cgt gga tca caa ggc        2130
Leu Ile Arg Lys Arg Ser Thr Arg Arg Ser Val Arg Gly Ser Gln Gly
            665             670             675

caa gac aga aag ctt agt acc aaa gag gct ctg gat gaa agt ata cct        2178
Gln Asp Arg Lys Leu Ser Thr Lys Glu Ala Leu Asp Glu Ser Ile Pro
            680             685             690

cca gtt tcc ttt tgg agg att atg aag cta aat tta act gag tgg cct        2226
Pro Val Ser Phe Trp Arg Ile Met Lys Leu Asn Leu Thr Glu Trp Pro
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tat ttt gtt gtt ggt gta ttt tgt gcc att ata aat gga ggt ctg caa        2274
Tyr Phe Val Val Gly Val Phe Cys Ala Ile Ile Asn Gly Gly Leu Gln
710             715             720             725

cca gca ttt gca gta ata ttt tca aag att ata ggg att ttt aca aga        2322
Pro Ala Phe Ala Val Ile Phe Ser Lys Ile Ile Gly Ile Phe Thr Arg
            730             735             740

aat gat gat gcc gaa aca aaa cga cag aat agt aac ttg ttt tca cta        2370
Asn Asp Asp Ala Glu Thr Lys Arg Gln Asn Ser Asn Leu Phe Ser Leu
            745             750             755

ttg ttt cta gtc ctt gga att gtt tct ttt att aca ttt ttc ctt cag        2418
Leu Phe Leu Val Leu Gly Ile Val Ser Phe Ile Thr Phe Phe Leu Gln
            760             765             770

ggc ttc aca ttt ggc aaa gct gga gag atc ctc acc aag cgg ctc cga        2466
Gly Phe Thr Phe Gly Lys Ala Gly Glu Ile Leu Thr Lys Arg Leu Arg
            775             780             785

tac atg gtt ttc cga tcc atg ctc aga cag gat gtg agc tgg ttt gat        2514
Tyr Met Val Phe Arg Ser Met Leu Arg Gln Asp Val Ser Trp Phe Asp
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Asp Pro Lys Asn Thr Thr Gly Ala Leu Thr Thr Arg Leu Ala Asn Asp
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gct gct caa gtt aaa ggg gct ata ggt tcc agg ctt gct ata att acc      2610
Ala Ala Gln Val Lys Gly Ala Ile Gly Ser Arg Leu Ala Ile Ile Thr
            825                 830                 835

cag aat ata gca aat ctt ggg aca gga ata att ata tcc tta atc tat      2658
Gln Asn Ile Ala Asn Leu Gly Thr Gly Ile Ile Ile Ser Leu Ile Tyr
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ggt tgg caa ctg aca ctg tta ctc tta gca att gta ccc atc att gca      2706
Gly Trp Gln Leu Thr Leu Leu Leu Leu Ala Ile Val Pro Ile Ile Ala
            855                 860                 865

ata gca gga gtt gtt gaa atg aaa atg ttg tct gga caa gca ctg aaa      2754
Ile Ala Gly Val Val Glu Met Lys Met Leu Ser Gly Gln Ala Leu Lys
870                 875                 880                 885

gat aag aaa gaa cta gaa ggt gct ggg aag atc gct act gaa gca ata      2802
Asp Lys Lys Glu Leu Glu Gly Ala Gly Lys Ile Ala Thr Glu Ala Ile
            890                 895                 900

gaa aac ttc cga act gtt gtt tct ttg act cag gag cag aag ttt gaa      2850
Glu Asn Phe Arg Thr Val Val Ser Leu Thr Gln Glu Gln Lys Phe Glu
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cat atg tat gat cag agt ttg cag gta cca tac aga aac tct ttg agg      2898
His Met Tyr Asp Gln Ser Leu Gln Val Pro Tyr Arg Asn Ser Leu Arg
            920                 925                 930

aaa gca cac atc ttt gga atc acg ttt tcc ttc acg cag gca atg atg      2946
Lys Ala His Ile Phe Gly Ile Thr Phe Ser Phe Thr Gln Ala Met Met
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tat ttt tcc tat gct gga tgt ttc cgg ttt gga gcc tac ttg gtg gca      2994
Tyr Phe Ser Tyr Ala Gly Cys Phe Arg Phe Gly Ala Tyr Leu Val Ala
950                 955                 960                 965

cat agt ctc atg agc ttt gag gat gtt ctg tta gta ttt tca gct gtt      3042
His Ser Leu Met Ser Phe Glu Asp Val Leu Leu Val Phe Ser Ala Val
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gtc ttt ggt gcc atg gcc gtg ggg caa gtc agt tca ttt gct cct gac      3090
Val Phe Gly Ala Met Ala Val Gly Gln Val Ser Ser Phe Ala Pro Asp
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tat gcc aaa gcc aaa gta tca gca gcc cac atc atc atg atc att gaa      3138
Tyr Ala Lys Ala Lys Val Ser Ala Ala His Ile Ile Met Ile Ile Glu
            1000                1005                1010

aaa acc cct ttg att gac agc tac agc aca gaa ggc cta aag ccg aac      3186
Lys Thr Pro Leu Ile Asp Ser Tyr Ser Thr Glu Gly Leu Lys Pro Asn
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aca ttg gaa gga aat gtc aca ttt aat gaa gtt gta ttc aac tat ccc      3234
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acc cga ctg gac atc cca gtg ctt cag ggg ctg agc ctg gaa gtg aag    3282
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aag ggc cag acg ctg gcc ctg gtg ggc agc agt ggc tgt ggg aag agc    3330
Lys Gly Gln Thr Leu Ala Leu Val Gly Ser Ser Gly Cys Gly Lys Ser
            1065                1070                1075

acg gtg gtc cag ctc ctg gag cgg ttc tat gac ccc ttg gcg ggg aaa    3378
Thr Val Val Gln Leu Leu Glu Arg Phe Tyr Asp Pro Leu Ala Gly Lys
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gtg ctg ctt gac ggc aaa gaa ata aag caa ctg aat gtt cag tgg ctc    3426
Val Leu Leu Asp Gly Lys Glu Ile Lys Gln Leu Asn Val Gln Trp Leu
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cga gca cac ctg ggc atc gtg tcc cag gag ccc atc ctg ttt gac tgc    3474
Arg Ala His Leu Gly Ile Val Ser Gln Glu Pro Ile Leu Phe Asp Cys
110                     1115                1120                1125

agc att agt gag aac att gcc tat gga gac aac agc cgg gtg gtg tca    3522
Ser Ile Ser Glu Asn Ile Ala Tyr Gly Asp Asn Ser Arg Val Val Ser
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cag gaa gag atc gtg agg gca gcc aag gag gcc aat ata cac gcc ttc    3570
Gln Glu Glu Ile Val Arg Ala Ala Lys Glu Ala Asn Ile His Ala Phe
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atc gag tca ctg cct aat aaa tat agc acc aga gta gga gac aaa gga    3618
Ile Glu Ser Leu Pro Asn Lys Tyr Ser Thr Arg Val Gly Asp Lys Gly
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act cag ctc tct ggt ggc cag aaa caa cgc att gcc ata gct cgt gcc    3666
Thr Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala
    1175                    1180                1185

ctt gtt aga cag cct cat att ttg ctt ttg gat gaa gcc aca tca gct    3714
Leu Val Arg Gln Pro His Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala
190                     1195                1200                1205

ctg gat aca gaa agt gaa aag gtt gtc caa gaa gcc ctg gac aaa gcc    3762
Leu Asp Thr Glu Ser Glu Lys Val Val Gln Glu Ala Leu Asp Lys Ala
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aga gaa ggc cgt acc tgc att gtg att gct cac cgc ctg tcc acc atc    3810
Arg Glu Gly Arg Thr Cys Ile Val Ile Ala His Arg Leu Ser Thr Ile
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cag aat gca gac tta ata gtg gtg ttt cag aat ggc aga gtc aag gag    3858
Gln Asn Ala Asp Leu Ile Val Val Phe Gln Asn Gly Arg Val Lys Glu
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cac ggc aca cat cag cag ctg ctg gca cag aaa ggc atc tat ttt tca    3906
His Gly Thr His Gln Gln Leu Leu Ala Gln Lys Gly Ile Tyr Phe Ser
        1255                    1260                1265

atg gtc agt gtc cag gct gga gca aag cgc cag t gaactgtgac           3950
Met Val Ser Val Gln Ala Gly Ala Lys Arg Gln
270                     1275                1280
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Leu	Tyr	Met	Val	Val	Gly	Thr	Leu	Ala	Ala	Ile	Ile	His	Gly	Ala	Gly
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Leu	Pro	Leu	Met	Met	Leu	Val	Phe	Gly	Asp	Met	Thr	Asp	Thr	Phe	Ala
65				70					75					80	
Asn	Ala	Gly	Asn	Leu	Gly	Asp	Leu	Gly	Ala	Leu	Leu	Thr	Asn	Ser	Ser
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Asn	Ile	Thr	Asp	Thr	Val	Pro	Val	Met	Asn	Leu	Glu	Glu	Asp	Met	Thr
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His	Lys	Ile	Arg	Lys	Gln	Phe	Phe	His	Ala	Ile	Met	Arg	Gln	Glu	Ile
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Asp	Asp	Val	Ser	Lys	Ile	Asn	Glu	Gly	Ile	Gly	Asp	Lys	Ile	Gly	Met
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Phe	Phe	Gln	Ser	Met	Ala	Thr	Phe	Phe	Thr	Gly	Phe	Ile	Val	Gly	Phe
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Val	Leu	Ser	Lys	Glu	Tyr	Ser	Ile	Gly	Gln	Val	Leu	Thr	Val	Phe	Phe
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Ser	Val	Leu	Ile	Gly	Ala	Phe	Ser	Val	Gly	Gln	Ala	Ser	Pro	Ser	Ile
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Glu	Ala	Phe	Ala	Asn	Ala	Arg	Gly	Ala	Ala	Phe	Glu	Ile	Phe	Lys	Ile
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    Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn Leu Lys
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 5  Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly Cys Gly
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    Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro Thr Glu
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    Gly Met Val Ser Val Asp Gly Gln Asp Ile Arg Thr Ile Asn Val Arg
10      450                 455                 460
    Phe Leu Arg Glu Ile Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe
    465                 470                 475                 480
    Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asp Val Thr
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15  Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr Asp Phe
                    500                 505                 510
    Ile Met Lys Leu Pro Gln Lys Phe Asp Thr Leu Val Gly Glu Arg Gly
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    Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala
20      530                 535                 540
    Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala
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    Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile Val Glu
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    Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr Phe Lys
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    Leu Val Thr Met Gln Thr Ala Gly Asn Glu Ile Glu Leu Glu Asn Ala
    625                 630                 635                 640
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35  Asp Ser Gly Ser Ser Leu Ile Arg Lys Arg Ser Thr Arg Arg Ser Val
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    Arg Gly Ser Gln Gly Gln Asp Arg Lys Leu Ser Thr Lys Glu Ala Leu
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    Asp Glu Ser Ile Pro Pro Val Ser Phe Trp Arg Ile Met Lys Leu Asn
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    785                 790                 795                 800
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                    805                 810                 815
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                820                 825                 830
    Leu Ala Ile Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly Ile Ile
            835                 840                 845
    Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu Ala Ile
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Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met Leu Ser
·865             870             875             880
Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly Lys Ile
            885             890             895
Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu Thr Gln
        900             905             910
Glu Gln Lys Phe Glu His Met Tyr Asp Gln Ser Leu Gln Val Pro Tyr
        915             920             925
Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Ile Thr Phe Ser Phe
    930             935             940
Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg Phe Gly
945             950             955             960
Ala Tyr Leu Val Ala His Ser Leu Met Ser Phe Glu Asp Val Leu Leu
            965             970             975
Val Phe Ser Ala Val Val Phe Gly Ala Met Ala Val Gly Gln Val Ser
            980             985             990
Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala Ala His Ile
        995             1000            1005
Ile Met Ile Ile Glu Lys Thr Pro Leu Ile Asp Ser Tyr Ser Thr Glu
    1010            1015            1020
Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Asn Glu Val
1025            1030            1035            1040
Val Phe Asn Tyr Pro Thr Arg Leu Asp Ile Pro Val Leu Gln Gly Leu
            1045            1050            1055
Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly Ser Ser
            1060            1065            1070
Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe Tyr Asp
    1075            1080            1085
Pro Leu Ala Gly Lys Val Leu Leu Asp Gly Lys Glu Ile Lys Gln Leu
    1090            1095            1100
Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln Glu Pro
1105            1110            1115            1120
Ile Leu Phe Asp Cys Ser Ile Ser Glu Asn Ile Ala Tyr Gly Asp Asn
            1125            1130            1135
Ser Arg Val Val Ser Gln Glu Glu Ile Val Arg Ala Ala Lys Glu Ala
            1140            1145            1150
Asn Ile His Ala Phe Ile Glu Ser Leu Pro Asn Lys Tyr Ser Thr Arg
            1155            1160            1165
Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile
    1170            1175            1180
Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu Leu Asp
1185            1190            1195            1200
Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val Gln Glu
            1205            1210            1215
Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile Ala His
        1220            1225            1230
Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe Gln Asn
    1235            1240            1245
Gly Arg Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala Gln Lys
    1250            1255            1260
Gly Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Ala Lys Arg Gln
1265            1270            1275            1280
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tcacgacttg gtggccgttc caaggagcgc gaggtcggg atg gat ctt gaa ggg        114
                                            Met Asp Leu Glu Gly
                                             1           5
```

```
gac cgc aat gga gga gca gag aag aag aac ttt ttt aaa ctg aac aat      162
Asp Arg Asn Gly Gly Ala Glu Lys Lys Asn Phe Phe Lys Leu Asn Asn
             10              15                  20
```

```
aaa agt aaa aaa gat aag aag gaa agg aaa cca act gtc agt gta ttt      210
Lys Ser Lys Lys Asp Lys Lys Glu Arg Lys Pro Thr Val Ser Val Phe
             25              30                  35
```

```
tca atg ttt cgc tat tca aat tgg ctt gac aag ttg tat atg gtg gtg      258
Ser Met Phe Arg Tyr Ser Asn Trp Leu Asp Lys Leu Tyr Met Val Val
             40              45              50
```

```
gga act ttg gct gcc atc atc cat gga gct gga ctt cct ctc atg atg      306
Gly Thr Leu Ala Ala Ile Ile His Gly Ala Gly Leu Pro Leu Met Met
         55              60              65
```

```
ctg gtg ttt gga gac atg acg gat acc ttt gca aat gca gga aat tta      354
Leu Val Phe Gly Asp Met Thr Asp Thr Phe Ala Asn Ala Gly Asn Leu
 70              75              80                      85
```

```
gga gat tta gga gct ctg ttg ttt aac aac act aat agc agt aat atc      402
Gly Asp Leu Gly Ala Leu Leu Phe Asn Asn Thr Asn Ser Ser Asn Ile
             90              95                  100
```

```
act gat aca gtg ccc gtc atg aat ctg gag gaa gat atg acc agg tat      450
Thr Asp Thr Val Pro Val Met Asn Leu Glu Glu Asp Met Thr Arg Tyr
             105             110                 115
```

```
gcc tat tat tac agt gga att ggt gct ggg gtg ctg gtt gct gct tac      498
Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu Val Ala Ala Tyr
             120             125             130
```

```
att cag gtt tca ttt tgg tgc ctg gca gct gga aga caa ata cac aaa      546
Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg Gln Ile His Lys
     135             140             145
```

```
att aga aaa cag ttt ttt cat gct ata atg cga cag gag ata ggc tgg      594
Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln Glu Ile Gly Trp
 150             155             160                     165
```

```
ttt gat gtg cac gat gtt ggg gag ctt aac acc cgg ctt aca gat gat      642
Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg Leu Thr Asp Asp
             170             175             180
```

```
gtc tcc aag att aat gaa gga att ggt gac aaa att gga atg ttc ttt      690
Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys Ile Gly Met Phe Phe
             185             190             195
```

```
cag tca atg gca aca ttt ttc act ggg ttt ata gta gga ttt aca cgt      738
Gln Ser Met Ala Thr Phe Phe Thr Gly Phe Ile Val Gly Phe Thr Arg
         200             205             210
```

```
    ggt tgg aag cta acc ctt gtg att ttg gcc atc agt cct gtt ctt gga      786
    Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser Pro Val Leu Gly
        215             220                 225

5   ctg tca gct gca gtc tgg gca aag ata ctg tct tca ttt act gat aaa      834
    Leu Ser Ala Ala Val Trp Ala Lys Ile Leu Ser Ser Phe Thr Asp Lys
    230             235                 240                 245

10  gaa ctc tta gct tat gca aaa gct gga gca gta gct gaa gag gtc ttg      882
    Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala Glu Glu Val Leu
                250                 255                 260

    gca gca att aga act gtg att gca ttt gga gga caa aag aaa gaa ctc      930
    Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln Lys Lys Glu Leu
15              265                 270                 275

    gaa agg tac aac aaa aat tta gaa gaa gct aaa aga att ggg ata aag      978
    Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Arg Ile Gly Ile Lys
                280                 285                 290
20
    aaa gct att aca gcc aat att tct ata ggt gct gct ttc ctg ctt atc     1026
    Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala Phe Leu Leu Ile
        295                 300                 305

25  tat gca tct tat gct ctg gcc ttc tgg tat ggg acc acc ttg gtc ctc     1074
    Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr Thr Leu Val Leu
    310             315                 320                 325

30  tca aag gaa tat tct att gga caa gta ctc act gta ttc ttt tct gta     1122
    Ser Lys Glu Tyr Ser Ile Gly Gln Val Leu Thr Val Phe Phe Ser Val
                330                 335                 340

    tta att ggg gct ttt agt gtt gga cag gca tct cca agc att gaa gca     1170
    Leu Ile Gly Ala Phe Ser Val Gly Gln Ala Ser Pro Ser Ile Glu Ala
35              345                 350                 355

    ttt gca aat gca aga gga gca gct ttt gaa atc ttc aag ata att gat     1218
    Phe Ala Asn Ala Arg Gly Ala Ala Phe Glu Ile Phe Lys Ile Ile Asp
        360                 365                 370
40
    aat aag cca agt att gac agc tat tcg aag agt ggg cac aaa cca gat     1266
    Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly His Lys Pro Asp
        375                 380                 385

45  aat att aag gga aat ttg gaa ttc aga aat gtt cac ttc agt tac cca     1314
    Asn Ile Lys Gly Asn Leu Glu Phe Arg Asn Val His Phe Ser Tyr Pro
    390                 395                 400                 405

    tct cga aaa gaa gtt aag atc ttg aag ggc ctg aac ctg aag gtg cag     1362
50  Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn Leu Lys Val Gln
                410                 415                 420

    agt ggg cag acg gtg gcc ctg gtt gga aac agc ggc tgt ggg aag agc     1410
    Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly Cys Gly Lys Ser
55              425                 430                 435

    aca acg gtc cag ctg atg cag agg ctt tat gac ccc aca gag ggc atg     1458
    Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro Thr Glu Gly Met
                440                 445                 450
60
```

```
    gtc agt gtt gat gga cag gat att agg acc ata aac gta agg ttt cta      1506
    Val Ser Val Asp Gly Gln Asp Ile Arg Thr Ile Asn Val Arg Phe Leu
        455             460                 465

5   cgg gaa atc atc ggt gtg gtg agt cag gaa cct gta ttg ttt gcc acc      1554
    Arg Glu Ile Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe Ala Thr
    470             475             480                 485

10  acg ata gct gaa aac att cgc tat ggt cgt gaa gat gtc acc atg gat      1602
    Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asp Val Thr Met Asp
                490             495                 500

    gag att gag aaa gct gtc aag gaa gcc aat gcc tat gac ttt atc atg      1650
    Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr Asp Phe Ile Met
15          505             510                 515

    aaa ctg cct cag aaa ttt gac acc ctg gtt gga gag aga ggg gcc cag      1698
    Lys Leu Pro Gln Lys Phe Asp Thr Leu Val Gly Glu Arg Gly Ala Gln
            520             525             530
20
    ctg agt ggt ggg cag aag cag agg atc gcc att gca cgt gcc ctg gtt      1746
    Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val
        535             540             545

25  cgc aac ccc aag atc ctc ctg ctg gac gag gcc acg tca gcc ttg gac      1794
    Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp
    550             555             560                 565

    aca gaa agt gaa gca gtg gtt cag gtg gct ctg gat aag gcc aga aaa      1842
    Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp Lys Ala Arg Lys
30              570             575             580

    ggt cgg acc acc att gtg ata gct cat cgt ttg tct acg gtt cgt aat      1890
    Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser Thr Val Arg Asn
35              585             590             595

    gcc gac gtc atc gct ggt ttc gat gat gga gtc att gtg gag aaa gga      1938
    Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile Val Glu Lys Gly
                600             605             610
40
    aat cat gat gag ctc atg aaa gag aaa ggc att tac ttc aaa ctt gtc      1986
    Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr Phe Lys Leu Val
        615             620             625

45  aca atg cag aca gca gga aat gaa att gaa tta gaa aat gca gct gat      2034
    Thr Met Gln Thr Ala Gly Asn Glu Ile Glu Leu Glu Asn Ala Ala Asp
    630             635             640                 645

    gaa tcc aaa agt gaa att gat acc ttg gaa atg tct tca cat gat tca      2082
50  Glu Ser Lys Ser Glu Ile Asp Thr Leu Glu Met Ser Ser His Asp Ser
                650             655                 660

    gga tcc agt cta ata aga aaa aga tcc act cgt agg agt gtc cgt gga      2130
    Gly Ser Ser Leu Ile Arg Lys Arg Ser Thr Arg Arg Ser Val Arg Gly
55          665             670             675

    tca caa ggc caa gac aga aag ctt agt acc aaa gag gct ctg gat gaa      2178
    Ser Gln Gly Gln Asp Arg Lys Leu Ser Thr Lys Glu Ala Leu Asp Glu
        680             685             690
60
```

```
agt ata cct cca gtt tcc ttt tgg agg att atg aag cta aat tta act      2226
Ser Ile Pro Pro Val Ser Phe Trp Arg Ile Met Lys Leu Asn Leu Thr
    695             700             705
```

```
gag tgg cct tat ttt gtt gtt ggt gta ttt tgt gcc att ata aat gga      2274
Glu Trp Pro Tyr Phe Val Val Gly Val Phe Cys Ala Ile Ile Asn Gly
710             715             720                 725
```

```
ggt ctg caa cca gca ttt gca gta ata ttt tca aag att ata ggg att      2322
Gly Leu Gln Pro Ala Phe Ala Val Ile Phe Ser Lys Ile Ile Gly Ile
            730             735                 740
```

```
ttt aca aga aat gat gat gcc gaa aca aaa cga cag aat agt aac ttg      2370
Phe Thr Arg Asn Asp Asp Ala Glu Thr Lys Arg Gln Asn Ser Asn Leu
            745             750             755
```

```
ttt tca cta ttg ttt cta gtc ctt gga att gtt tct ttt att aca ttt      2418
Phe Ser Leu Leu Phe Leu Val Leu Gly Ile Val Ser Phe Ile Thr Phe
        760             765             770
```

```
ttc ctt cag ggc ttc aca ttt ggc aaa gct gga gag atc ctc acc aag      2466
Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu Ile Leu Thr Lys
    775             780             785
```

```
cgg ctc cga tac atg gtt ttc cga tcc atg ctc aga cag gat gtg agc      2514
Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg Gln Asp Val Ser
790             795             800                 805
```

```
tgg ttt gat gac cct aaa aac acc act gga gca ttg act acc agg ctc      2562
Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu Thr Thr Arg Leu
            810             815             820
```

```
gcc aat gat gct gct caa gtt aaa ggg gct ata ggt tcc agg ctt gct      2610
Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly Ser Arg Leu Ala
            825             830             835
```

```
ata att acc cag aat ata gca aat ctt ggg aca gga ata att ata tcc      2658
Ile Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly Ile Ile Ile Ser
        840             845             850
```

```
tta atc tat ggt tgg caa ctg aca ctg tta ctc tta gca att gta ccc      2706
Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Ala Ile Val Pro
    855             860             865
```

```
atc att gca ata gca gga gtt gtt gaa atg aaa atg ttg tct gga caa      2754
Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met Leu Ser Gly Gln
870             875             880                 885
```

```
gca ctg aaa gat aag aaa gaa cta gaa ggt gct ggg aag atc gct act      2802
Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly Lys Ile Ala Thr
            890             895                 900
```

```
gaa gca ata gaa aac ttc cga act gtt gtt tct ttg act cag gag cag      2850
Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu Thr Gln Glu Gln
            905             910             915
```

```
aag ttt gaa cat atg tat gat cag agt ttg cag gta cca tac aga aac      2898
Lys Phe Glu His Met Tyr Asp Gln Ser Leu Gln Val Pro Tyr Arg Asn
            920             925             930
```

```
       tct ttg agg aaa gca cac atc ttt gga atc acg ttt tcc ttc acg cag    2946
       Ser Leu Arg Lys Ala His Ile Phe Gly Ile Thr Phe Ser Phe Thr Gln
           935             940                 945

   5   gca atg atg tat ttt tcc tat gct gga tgt ttc cgg ttt gga gcc tac    2994
       Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg Phe Gly Ala Tyr
       950             955                 960                 965

  10   ttg gtg gca cat agt ctc atg agc ttt gag gat gtt ctg tta gta ttt    3042
       Leu Val Ala His Ser Leu Met Ser Phe Glu Asp Val Leu Leu Val Phe
                   970                 975                 980

  15   tca gct gtt gtc ttt ggt gcc atg gcc gtg ggg caa gtc agt tca ttt    3090
       Ser Ala Val Val Phe Gly Ala Met Ala Val Gly Gln Val Ser Ser Phe
               985                 990                 995

  20   gct cct gac tat gcc aaa gcc aaa gta tca gca gcc cac atc atc atg    3138
       Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala Ala His Ile Ile Met
           1000            1005                1010

  25   atc att gaa aaa acc cct ttg att gac agc tac agc aca gaa ggc cta    3186
       Ile Ile Glu Lys Thr Pro Leu Ile Asp Ser Tyr Ser Thr Glu Gly Leu
           1015            1020                1025

       aag ccg aac aca ttg gaa gga aat gtc aca ttt aat gaa gtt gta ttc    3234
       Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Asn Glu Val Val Phe
       030             1035                1040                1045

  30   aac tat ccc acc cga ctg gac atc cca gtg ctt cag ggg ctg agc ctg    3282
       Asn Tyr Pro Thr Arg Leu Asp Ile Pro Val Leu Gln Gly Leu Ser Leu
               1050                1055                1060

  35   gaa gtg aag aag ggc cag acg ctg gcc ctg gtg ggc agc agt ggc tgt    3330
       Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly Ser Ser Gly Cys
               1065                1070                1075

  40   ggg aag agc acg gtg gtc cag ctc ctg gag cgg ttc tat gac ccc ttg    3378
       Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe Tyr Asp Pro Leu
           1080                1085                1090

       gcg ggg aaa gtg ctg ctt gac ggc aaa gaa ata aag caa ctg aat gtt    3426
       Ala Gly Lys Val Leu Leu Asp Gly Lys Glu Ile Lys Gln Leu Asn Val
           1095                1100                1105

  45   cag tgg ctc cga gca cac ctg ggc atc gtg tcc cag gag ccc atc ctg    3474
       Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln Glu Pro Ile Leu
       110             1115                1120                1125

  50   ttt gac tgc agc att agt gag aac att gcc tat gga gac aac agc cgg    3522
       Phe Asp Cys Ser Ile Ser Glu Asn Ile Ala Tyr Gly Asp Asn Ser Arg
                   1130                1135                1140

  55   gtg gtg tca cag gaa gag atc gtg agg gca gcc aag gag gcc aat ata    3570
       Val Val Ser Gln Glu Glu Ile Val Arg Ala Ala Lys Glu Ala Asn Ile
                   1145                1150                1155

       cac gcc ttc atc gag tca ctg cct aat aaa tat agc acc aga gta gga    3618
       His Ala Phe Ile Glu Ser Leu Pro Asn Lys Tyr Ser Thr Arg Val Gly
           1160                1165                1170
  60
```

```
gac aaa gga act cag ctc tct ggt ggc cag aaa caa cgc att gcc ata     3666
Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile
    1175                1180                1185
```

```
gct cgt gcc ctt gtt aga cag cct cat att ttg ctt ttg gat gaa gcc     3714
Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu Leu Asp Glu Ala
190                1195                1200                1205
```

```
aca tca gct ctg gat aca gaa agt gaa aag gtt gtc caa gaa gcc ctg     3762
Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val Gln Glu Ala Leu
                1210                1215                1220
```

```
gac aaa gcc aga gaa ggc cgt acc tgc att gtg att gct cac cgc ctg     3810
Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile Ala His Arg Leu
                1225                1230                1235
```

```
tcc acc atc cag aat gca gac tta ata gtg gtg ttt cag aat ggc aga     3858
Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe Gln Asn Gly Arg
                1240                1245                1250
```

```
gtc aag gag cac ggc aca cat cag cag ctg ctg gca cag aaa ggc atc     3906
Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala Gln Lys Gly Ile
    1255                1260                1265
```

```
tat ttt tca atg gtc agt gtc cag gct gga gca aag cgc cag t           3949
Tyr Phe Ser Met Val Ser Val Gln Ala Gly Ala Lys Arg Gln
270                1275                1280
```

```
gaactgtgac tgtatgagat gttaaatatt ttttaatatt tgtgtttaaa tatggcattt    4009
attcaaagtt aaaaagcaag tacttataga attatgaaga gttatctgtt taacatttcc    4069
tcaaccaagt tcagagtctt cagacactcg taattaaagg aagagagcga gagacatcat    4129
caagtggaga gaaataatgg tttaaattgc attataaatt ttataacaga gttaaagtag    4189
attttt
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Phe Lys Leu Asn Asn Lys Ser Lys Lys Asp Lys Lys Glu Arg Lys Pro
            20              25              30
Thr Val Ser Val Phe Ser Met Phe Arg Tyr Ser Asn Trp Leu Asp Lys
        35              40              45
Leu Tyr Met Val Val Gly Thr Leu Ala Ala Ile Ile His Gly Ala Gly
    50              55              60
Leu Pro Leu Met Met Leu Val Phe Gly Asp Met Thr Asp Thr Phe Ala
65              70              75              80
Asn Ala Gly Asn Leu Gly Asp Leu Gly Ala Leu Leu Phe Asn Asn Thr
            85              90              95
Asn Ser Ser Asn Ile Thr Asp Thr Val Pro Val Met Asn Leu Glu Glu
            100             105             110
Asp Met Thr Arg Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val
    115             120             125
Leu Val Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly
130             135             140
Arg Gln Ile His Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg
145             150             155             160
```

```
     Gln Glu Ile Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr
                 165             170                 175
     Arg Leu Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys
                 180             185                 190
5    Ile Gly Met Phe Phe Gln Ser Met Ala Thr Phe Phe Thr Gly Phe Ile
                 195             200                 205
     Val Gly Phe Thr Arg Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile
                 210             215                 220
     Ser Pro Val Leu Gly Leu Ser Ala Ala Val Trp Ala Lys Ile Leu Ser
10   225             230                 235                     240
     Ser Phe Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val
                 245             250                     255
     Ala Glu Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly
                 260             265                 270
15   Gln Lys Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys
                 275             280             285
     Arg Ile Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala
                 290             295             300
     Ala Phe Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly
20   305             310                 315                     320
     Thr Thr Leu Val Leu Ser Lys Glu Tyr Ser Ile Gly Gln Val Leu Thr
                 325             330                 335
     Val Phe Phe Ser Val Leu Ile Gly Ala Phe Ser Val Gly Gln Ala Ser
                 340             345                 350
25   Pro Ser Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Phe Glu Ile
                 355             360             365
     Phe Lys Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser
                 370             375             380
     Gly His Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Arg Asn Val
30   385             390             395                     400
     His Phe Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu
                 405             410                 415
     Asn Leu Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser
                 420             425                 430
35   Gly Cys Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp
                 435             440             445
     Pro Thr Glu Gly Met Val Ser Val Asp Gly Gln Asp Ile Arg Thr Ile
                 450             455             460
     Asn Val Arg Phe Leu Arg Glu Ile Ile Gly Val Val Ser Gln Glu Pro
40   465             470                 475                     480
     Val Leu Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu
                 485             490                 495
     Asp Val Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala
                 500             505                 510
45   Tyr Asp Phe Ile Met Lys Leu Pro Gln Lys Phe Asp Thr Leu Val Gly
                 515             520                 525
     Glu Arg Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile
                 530             535                 540
     Ala Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala
50   545             550                 555                     560
     Thr Ser Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu
                 565             570                 575
     Asp Lys Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu
                 580             585                 590
55   Ser Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val
                 595             600                 605
     Ile Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile
                 610             615                 620
     Tyr Phe Lys Leu Val Thr Met Gln Thr Ala Gly Asn Glu Ile Glu Leu
60   625             630                 635                     640
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```
     Glu Asn Ala Ala Asp Glu Ser Lys Ser Glu Ile Asp Thr Leu Glu Met
                     645             650                 655
     Ser Ser His Asp Ser Gly Ser Ser Leu Ile Arg Lys Arg Ser Thr Arg
                 660             665                 670
 5   Arg Ser Val Arg Gly Ser Gln Gly Gln Asp Arg Lys Leu Ser Thr Lys
             675             680                 685
     Glu Ala Leu Asp Glu Ser Ile Pro Pro Val Ser Phe Trp Arg Ile Met
         690             695             700
     Lys Leu Asn Leu Thr Glu Trp Pro Tyr Phe Val Val Gly Val Phe Cys
10   705             710             715                 720
     Ala Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ala Val Ile Phe Ser
                 725             730                 735
     Lys Ile Ile Gly Ile Phe Thr Arg Asn Asp Asp Ala Glu Thr Lys Arg
                 740             745                 750
15   Gln Asn Ser Asn Leu Phe Ser Leu Leu Phe Leu Val Leu Gly Ile Val
                 755             760                 765
     Ser Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly
         770             775             780
     Glu Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu
20   785             790             795                 800
     Arg Gln Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala
                 805             810                 815
     Leu Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile
                 820             825                 830
25   Gly Ser Arg Leu Ala Ile Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr
             835             840                 845
     Gly Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu
         850             855             860
     Leu Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys
30   865             870             875                 880
     Met Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala
                 885             890                 895
     Gly Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser
                 900             905                 910
35   Leu Thr Gln Glu Gln Lys Phe Glu His Met Tyr Asp Gln Ser Leu Gln
             915             920                 925
     Val Pro Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Ile Thr
         930             935                 940
     Phe Ser Phe Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe
40   945             950                 955                 960
     Arg Phe Gly Ala Tyr Leu Val Ala His Ser Leu Met Ser Phe Glu Asp
                 965             970                 975
     Val Leu Leu Val Phe Ser Ala Val Val Phe Gly Ala Met Ala Val Gly
                 980             985                 990
     Gln Val Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala
45   995             1000                1005
     Ala His Ile Ile Met Ile Ile Glu Lys Thr Pro Leu Ile Asp Ser Tyr
         1010            1015                1020
     Ser Thr Glu Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe
50   1025            1030                1035                1040
     Asn Glu Val Val Phe Asn Tyr Pro Thr Arg Leu Asp Ile Pro Val Leu
                 1045            1050                1055
     Gln Gly Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val
                 1060            1065                1070
55   Gly Ser Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg
             1075            1080                1085
     Phe Tyr Asp Pro Leu Ala Gly Lys Val Leu Leu Asp Gly Lys Glu Ile
         1090            1095                1100
     Lys Gln Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser
60   1105            1110                1115                1120
```

18

Gln Glu Pro Ile Leu Phe Asp Cys Ser Ile Ser Glu Asn Ile Ala Tyr
                1125   1130   1135
Gly Asp Asn Ser Arg Val Val Ser Gln Glu Glu Ile Val Arg Ala Ala
            1140   1145   1150
Lys Glu Ala Asn Ile His Ala Phe Ile Glu Ser Leu Pro Asn Lys Tyr
            1155   1160   1165
Ser Thr Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys
    1170   1175   1180
Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu
1185   1190   1195   1200
Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val
            1205   1210   1215
Val Gln Glu Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val
            1220   1225   1230
Ile Ala His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val
            1235   1240   1245
Phe Gln Asn Gly Arg Val Lys Glu His Gly Thr His Gln Gln Leu Leu
    1250   1255   1260
Ala Gln Lys Gly Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Ala
20 1265   1270   1275   1280
Lys Arg Gln

<210> 5
<211> 1280
<212> PRT
<213> Homo sapiens

<400> 5
Met Asp Leu Glu Gly Asp Arg Asn Gly Gly Ala Lys Lys Lys Asn Phe
1   5   10   15
Phe Lys Leu Asn Asn Lys Ser Glu Lys Asp Lys Lys Glu Lys Lys Pro
            20   25   30
Thr Val Ser Val Phe Ser Met Phe Arg Tyr Ser Asn Trp Leu Asp Lys
        35   40   45
Leu Tyr Met Val Val Gly Thr Leu Ala Ala Ile Ile His Gly Ala Gly
    50   55   60
Leu Pro Leu Met Met Leu Val Phe Gly Glu Met Thr Asp Ile Phe Ala
65   70   75   80
Asn Ala Gly Asn Leu Glu Asp Leu Met Ser Asn Ile Thr Asn Arg Ser
            85   90   95
Asp Ile Asn Asp Thr Gly Phe Phe Met Asn Leu Glu Glu Asp Met Thr
        100   105   110
Arg Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu Val Ala
    115   120   125
Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg Gln Ile
    130   135   140
His Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln Glu Ile
145   150   155   160
Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg Leu Thr
            165   170   175
Asp Asp Val Ser Lys Ile Asn Glu Val Ile Gly Asp Lys Ile Gly Met
            180   185   190
Phe Phe Gln Ser Met Ala Thr Phe Phe Thr Gly Phe Ile Val Gly Phe
    195   200   205
Thr Arg Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser Pro Val
210   215   220
Leu Gly Leu Ser Ala Ala Val Trp Ala Lys Ile Leu Ser Ser Phe Thr
225   230   235   240
Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala Glu Glu

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                         245                      250                      255
        Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln Lys Lys
                260                      265                      270
        Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Arg Ile Gly
  5             275                      280                      285
        Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala Phe Leu
              290                      295                      300
        Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr Thr Leu
        305                      310                      315                      320
 10     Val Leu Ser Gly Glu Tyr Ser Ile Gly Gln Val Leu Thr Val Phe Phe
                325                      330                      335
        Ser Val Leu Ile Gly Ala Phe Ser Val Gly Gln Ala Ser Pro Ser Ile
                340                      345                      350
        Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe Lys Ile
 15             355                      360                      365
        Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly His Lys
              370                      375                      380
        Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Arg Asn Val His Phe Ser
        385                      390                      395                      400
 20     Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn Leu Lys
                    405                      410                      415
        Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly Cys Gly
                420                      425                      430
        Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro Thr Glu
 25             435                      440                      445
        Gly Met Val Ser Val Asp Gly Gln Asp Ile Arg Thr Ile Asn Val Arg
              450                      455                      460
        Phe Leu Arg Glu Ile Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe
        465                      470                      475                      480
 30     Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn Val Thr
                    485                      490                      495
        Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr Asp Phe
                500                      505                      510
        Ile Met Lys Leu Pro His Lys Phe Asp Thr Leu Val Gly Glu Arg Gly
 35             515                      520                      525
        Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala
              530                      535                      540
        Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala
        545                      550                      555                      560
 40     Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp Lys Ala
                    565                      570                      575
        Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser Thr Val
                580                      585                      590
        Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile Val Glu
 45             595                      600                      605
        Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr Phe Lys
              610                      615                      620
        Leu Val Thr Met Gln Thr Ala Gly Asn Glu Val Glu Leu Glu Asn Ala
        625                      630                      635                      640
 50     Ala Asp Glu Ser Lys Ser Glu Ile Asp Ala Leu Glu Met Ser Ser Asn
                    645                      650                      655
        Asp Ser Arg Ser Ser Leu Ile Arg Lys Arg Ser Thr Arg Arg Ser Val
                660                      665                      670
        Arg Gly Ser Gln Ala Gln Asp Arg Lys Leu Ser Thr Lys Glu Ala Leu
 55             675                      680                      685
        Asp Glu Ser Ile Pro Pro Val Ser Phe Trp Arg Ile Met Lys Leu Asn
              690                      695                      700
        Leu Thr Glu Trp Pro Tyr Phe Val Val Gly Val Phe Cys Ala Ile Ile
        705                      710                      715                      720
 60     Asn Gly Gly Leu Gln Pro Ala Phe Ala Ile Ile Phe Ser Lys Ile Ile
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                      725                    730                    735
      Gly Val Phe Thr Arg Ile Asp Asp Pro Glu Thr Lys Arg Gln Asn Ser
                  740                    745                    750
      Asn Leu Phe Ser Leu Leu Phe Leu Ala Leu Gly Ile Ile Ser Phe Ile
  5               755                    760                    765
      Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu Ile Leu
                  770                    775                    780
      Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg Gln Asp
      785                    790                    795                    800
 10   Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu Thr Thr
                      805                    810                    815
      Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly Ser Arg
                  820                    825                    830
      Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly Ile Ile
 15               835                    840                    845
      Ile Ser Phe Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu Ala Ile
                  850                    855                    860
      Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met Leu Ser
      865                    870                    875                    880
 20   Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly Lys Ile
                      885                    890                    895
      Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu Thr Gln
                  900                    905                    910
      Glu Gln Lys Phe Glu His Met Tyr Ala Gln Ser Leu Gln Val Pro Tyr
 25               915                    920                    925
      Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Ile Thr Phe Ser Phe
                  930                    935                    940
      Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg Phe Gly
      945                    950                    955                    960
 30   Ala Tyr Leu Val Ala His Lys Leu Met Ser Phe Glu Asp Val Leu Leu
                      965                    970                    975
      Val Phe Ser Ala Val Val Phe Gly Ala Met Ala Val Gly Gln Val Ser
                  980                    985                    990
      Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Ile Ser Ala Ala His Ile
 35               995                    1000                   1005
      Ile Met Ile Ile Glu Lys Thr Pro Leu Ile Asp Ser Tyr Ser Thr Glu
                  1010                   1015                   1020
      Gly Leu Met Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Gly Glu Val
      1025                   1030                   1035                   1040
 40   Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln Gly Leu
                      1045                   1050                   1055
      Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly Ser Ser
                  1060                   1065                   1070
      Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe Tyr Asp
 45               1075                   1080                   1085
      Pro Leu Ala Gly Lys Val Leu Leu Asp Gly Lys Glu Ile Lys Arg Leu
                  1090                   1095                   1100
      Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln Glu Pro
      1105                   1110                   1115                   1120
 50   Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly Asp Asn
                      1125                   1130                   1135
      Ser Arg Val Val Ser Gln Glu Glu Ile Val Arg Ala Ala Lys Glu Ala
                  1140                   1145                   1150
      Asn Ile His Ala Phe Ile Glu Ser Leu Pro Asn Lys Tyr Ser Thr Lys
 55               1155                   1160                   1165
      Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile
                  1170                   1175                   1180
      Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu Leu Asp
      1185                   1190                   1195                   1200
 60   Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val Gln Glu
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                      1205                    1210                    1215
        Ala Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile Ala His
                  1220                    1225                    1230
        Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe Gln Asn
  5               1235                    1240                    1245
        Gly Arg Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala Gln Lys
              1250                    1255                    1260
        Gly Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Thr Lys Arg Gln
        1265                    1270                    1275                    1280
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            <210> 6
            <211> 1279
            <212> PRT
            <213> Homo sapiens
 15

            <400> 6
        Met Asp Leu Glu Gly Asp Arg Asn Gly Gly Ala Lys Lys Lys Asn Phe
          1               5                   10                      15
        Phe Lys Leu Asn Asn Lys Ser Glu Lys Asp Lys Lys Glu Lys Lys Pro
 20               20                      25                      30
        Thr Val Ser Val Phe Ser Met Phe Arg Tyr Ser Asn Trp Leu Asp Lys
                  35                      40                      45
        Leu Tyr Met Val Val Gly Thr Leu Ala Ala Ile Ile His Gly Ala Gly
                  50                      55                      60
 25     Leu Pro Leu Met Met Leu Val Phe Gly Glu Met Thr Asp Ile Phe Ala
        65                      70                      75                      80
        Asn Ala Gly Asn Leu Glu Asp Leu Met Ser Asn Ile Thr Asn Arg Ser
                          85                      90                      95
        Asp Ile Asn Asp Thr Gly Phe Phe Met Asn Leu Glu Glu Asp Met Thr
 30                   100                     105                     110
        Arg Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu Val Ala
                  115                     120                     125
        Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg Gln Ile
                  130                     135                     140
 35     His Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln Glu Ile
        145                     150                     155                     160
        Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg Leu Thr
                          165                     170                     175
        Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys Ile Gly Met
 40                   180                     185                     190
        Phe Phe Gln Ser Met Ala Thr Phe Phe Thr Gly Phe Ile Val Gly Phe
                  195                     200                     205
        Thr Arg Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser Pro Val
                  210                     215                     220
 45     Leu Gly Leu Ser Ala Ala Val Trp Ala Lys Ile Leu Ser Ser Phe Thr
        225                     230                     235                     240
        Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala Glu Glu
                          245                     250                     255
        Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln Lys Lys
 50                   260                     265                     270
        Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Arg Ile Gly
                  275                     280                     285
        Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala Phe Leu
                  290                     295                     300
 55     Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr Thr Leu
        305                     310                     315                     320
        Val Leu Ser Gly Glu Tyr Ser Ile Gly Gln Val Leu Thr Val Phe Ser
                          325                     330                     335
        Val Leu Ile Gly Ala Phe Ser Val Gly Gln Ala Ser Pro Ser Ile Glu
 60                   340                     345                     350
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    Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe Lys Ile Ile
        355                 360             365
    Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly His Lys Pro
        370             375             380
 5  Asp Asn Ile Lys Gly Asn Leu Glu Phe Arg Asn Val His Phe Ser Tyr
    385             390             395                 400
    Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn Leu Lys Val
                405             410                 415
    Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly Cys Gly Lys
10      420             425                 430
    Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro Thr Glu Gly
            435             440             445
    Met Val Ser Val Asp Gly Gln Asp Ile Arg Thr Ile Asn Val Arg Phe
        450             455             460
15  Leu Arg Glu Ile Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe Ala
    465             470             475                 480
    Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn Val Thr Met
                485             490             495
    Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr Asp Phe Ile
20      500             505             510
    Met Lys Leu Pro His Lys Phe Asp Thr Leu Val Gly Glu Arg Gly Ala
        515             520             525
    Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu
        530             535             540
25  Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu
    545             550             555                 560
    Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp Lys Ala Arg
            565             570             575
    Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser Thr Val Arg
30      580             585             590
    Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile Val Glu Lys
        595             600             605
    Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr Phe Lys Leu
        610             615             620
35  Val Thr Met Gln Thr Ala Gly Asn Glu Val Glu Leu Glu Asn Ala Ala
    625             630             635                 640
    Asp Glu Ser Lys Ser Glu Ile Asp Ala Leu Glu Met Ser Ser Asn Asp
                645             650             655
    Ser Arg Ser Ser Leu Ile Arg Lys Arg Ser Thr Arg Arg Ser Val Arg
40      660             665             670
    Gly Ser Gln Ala Gln Asp Arg Lys Leu Ser Thr Lys Glu Ala Leu Asp
        675             680             685
    Glu Ser Ile Pro Pro Val Ser Phe Trp Arg Ile Met Lys Leu Asn Leu
        690             695             700
45  Thr Glu Trp Pro Tyr Phe Val Val Gly Val Phe Cys Ala Ile Ile Asn
    705             710             715                 720
    Gly Gly Leu Gln Pro Ala Phe Ala Ile Ile Phe Ser Lys Ile Ile Gly
                725             730             735
    Val Phe Thr Arg Ile Asp Asp Pro Glu Thr Lys Arg Gln Asn Ser Asn
50      740             745             750
    Leu Phe Ser Leu Leu Phe Leu Ala Leu Gly Ile Ile Ser Phe Ile Thr
            755             760             765
    Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu Ile Leu Thr
     ·  770             775             780
55  Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg Gln Asp Val
    785             790             795                 800
    Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu Thr Thr Arg
            805             810             815
    Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly Ser Arg Leu
60      820             825             830
```

```
Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly Ile Ile Ile
    835                 840                 845
Ser Phe Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu Ala Ile Val
    850                 855                 860
Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met Leu Ser Gly
865                 870                 875                 880
Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly Lys Ile Ala
            885                 890                 895
Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu Thr Gln Glu
            900                 905                 910
Gln Lys Phe Glu His Met Tyr Ala Gln Ser Leu Gln Val Pro Tyr Arg
        915                 920                 925
Asn Ser Leu Arg Lys Ala His Ile Phe Gly Ile Thr Phe Ser Phe Thr
    930                 935                 940
Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg Phe Gly Ala
945                 950                 955                 960
Tyr Leu Val Ala His Lys Leu Met Ser Phe Glu Asp Val Leu Leu Val
            965                 970                 975
Phe Ser Ala Val Val Phe Gly Ala Met Ala Val Gly Gln Val Ser Ser
            980                 985                 990
Phe Ala Pro Asp Tyr Ala Lys Ala Lys Ile Ser Ala Ala His Ile Ile
    995                 1000                1005
Met Ile Ile Glu Lys Thr Pro Leu Ile Asp Ser Tyr Ser Thr Glu Gly
    1010                1015                1020
Leu Met Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Gly Glu Val Val
1025                1030                1035                1040
Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln Gly Leu Ser
            1045                1050                1055
Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly Ser Ser Gly
            1060                1065                1070
Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe Tyr Asp Pro
            1075                1080                1085
Leu Ala Gly Lys Val Leu Leu Asp Gly Lys Glu Ile Lys Arg Leu Asn
    1090                1095                1100
Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln Glu Pro Ile
1105                1110                1115                1120
Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly Asp Asn Ser
            1125                1130                1135
Arg Val Val Ser Gln Glu Glu Ile Val Arg Ala Ala Lys Glu Ala Asn
40      1140                1145                1150
Ile His Ala Phe Ile Glu Ser Leu Pro Asn Lys Tyr Ser Thr Lys Val
    1155                1160                1165
Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala
    1170                1175                1180
Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu Leu Asp Glu
1185                1190                1195                1200
Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val Gln Glu Ala
            1205                1210                1215
Leu Asp Lys Ala Arg Glu Gly Arg Thr Cys Ile Val Ile Ala His Arg
            1220                1225                1230
Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe Gln Asn Gly
        1235                1240                1245
Arg Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala Gln Lys Gly
    1250                1255                1260
Ile Tyr Phe Ser Met Val Ser Val Gln Ala Gly Thr Lys Arg Gln
1265                1270                1275
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<210> 7
<211> 1280
<212> PRT

<213> Canis familiaris

<400> 7

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      Met Asp Pro Glu Gly Gly Arg Lys Gly Ser Ala Glu Lys Asn Phe Trp
 5    1               5                   10                  15
      Lys Met Gly Lys Lys Ser Lys Lys Glu Lys Lys Glu Lys Lys Pro Thr
                      20                  25                  30
      Val Ser Thr Phe Ala Met Phe Arg Tyr Ser Asn Trp Leu Asp Arg Leu
                  35                  40                  45
10    Tyr Met Leu Val Gly Thr Met Ala Ala Ile Ile His Gly Ala Ala Leu
          50                  55                  60
      Pro Leu Met Met Leu Val Phe Gly Asn Met Thr Asp Ser Phe Ala Asn
      65                  70                  75                  80
      Ala Gly Ile Ser Arg Asn Lys Thr Phe Pro Val Ile Ile Asn Glu Ser
15                        85                  90                  95
      Ile Thr Asn Asn Thr Gln His Phe Ile Asn His Leu Glu Glu Glu Met
                      100                 105                 110
      Thr Thr Tyr Ala Tyr Tyr Tyr Ser Gly Ile Gly Ala Gly Val Leu Val
                  115                 120                 125
      Ala Ala Tyr Ile Gln Val Ser Phe Trp Cys Leu Ala Ala Gly Arg Gln
 20                   130                 135                 140
      Ile Leu Lys Ile Arg Lys Gln Phe Phe His Ala Ile Met Arg Gln Glu
      145                 150                 155                 160
      Ile Gly Trp Phe Asp Val His Asp Val Gly Glu Leu Asn Thr Arg Leu
 25                   165                 170                 175
      Thr Asp Asp Val Ser Lys Ile Asn Glu Gly Ile Gly Asp Lys Val Gly
                      180                 185                 190
      Met Phe Phe Gln Ser Ile Ala Thr Phe Phe Thr Gly Phe Ile Val Gly
                  195                 200                 205
30    Phe Thr Pro Gly Trp Lys Leu Thr Leu Val Ile Leu Ala Ile Ser Pro
          210                 215                 220
      Val Leu Gly Leu Ser Ala Ala Ile Trp Ala Lys Ile Leu Ser Ser Phe
      225                 230                 235                 240
      Thr Asp Lys Glu Leu Leu Ala Tyr Ala Lys Ala Gly Ala Val Ala Glu
 35                   245                 250                 255
      Glu Val Leu Ala Ala Ile Arg Thr Val Ile Ala Phe Gly Gly Gln Lys
                  260                 265                 270
      Lys Glu Leu Glu Arg Tyr Asn Lys Asn Leu Glu Glu Ala Lys Arg Ile
                  275                 280                 285
40    Gly Ile Lys Lys Ala Ile Thr Ala Asn Ile Ser Ile Gly Ala Ala Phe
          290                 295                 300
      Leu Leu Ile Tyr Ala Ser Tyr Ala Leu Ala Phe Trp Tyr Gly Thr Ser
      305                 310                 315                 320
      Leu Val Leu Ser Ser Glu Tyr Thr Ile Gly Gln Val Leu Thr Val Phe
 45                   325                 330                 335
      Phe Ser Val Leu Ile Gly Ala Phe Ser Ile Gly Gln Ala Ser Pro Ser
                  340                 345                 350
      Ile Glu Ala Phe Ala Asn Ala Arg Gly Ala Ala Tyr Glu Ile Phe Lys
                  355                 360                 365
50    Ile Ile Asp Asn Lys Pro Ser Ile Asp Ser Tyr Ser Lys Ser Gly His
          370                 375                 380
      Lys Pro Asp Asn Ile Lys Gly Asn Leu Glu Phe Lys Asn Val His Phe
      385                 390                 395                 400
      Ser Tyr Pro Ser Arg Lys Glu Val Lys Ile Leu Lys Gly Leu Asn Leu
 55                   405                 410                 415
      Lys Val Gln Ser Gly Gln Thr Val Ala Leu Val Gly Asn Ser Gly Cys
                  420                 425                 430
      Gly Lys Ser Thr Thr Val Gln Leu Met Gln Arg Leu Tyr Asp Pro Thr
                  435                 440                 445
60    Asp Gly Met Val Cys Ile Asp Gly Gln Asp Ile Arg Thr Ile Asn Val
```

```
           450                      455                      460
     Arg His Leu Arg Glu Ile Thr Gly Val Val Ser Gln Glu Pro Val Leu
     465                      470                  475                  480
     Phe Ala Thr Thr Ile Ala Glu Asn Ile Arg Tyr Gly Arg Glu Asn Val
 5                       485                  490                  495
     Thr Met Asp Glu Ile Glu Lys Ala Val Lys Glu Ala Asn Ala Tyr Asp
                     500                  505                  510
     Phe Ile Met Lys Leu Pro Asn Lys Phe Asp Thr Leu Val Gly Glu Arg
                     515                  520                  525
10   Gly Ala Arg Leu Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg
                     530                  535                  540
     Ala Leu Val Arg Asn Pro Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser
     545                      550                  555                  560
     Ala Leu Asp Thr Glu Ser Glu Ala Val Val Gln Val Ala Leu Asp Lys
 15                      565                  570                  575
     Ala Arg Lys Gly Arg Thr Thr Ile Val Ile Ala His Arg Leu Ser Thr
                     580                  585                  590
     Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val Ile Val
                     595                  600                  605
20   Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile Tyr Phe
                     610                  615                  620
     Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Glu Leu Glu Asn
     625                      630                  635                  640
     Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met Ser Pro
 25                      645                  650                  655
     Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg Arg Ser
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     Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys Glu Asp
                     675                  680                  685
30   Leu Asn Glu Asn Val Pro Ser Val Ser Phe Trp Arg Ile Leu Lys Leu
                     690                  695                  700
     Asn Ser Thr Glu Trp Pro Tyr Phe Val Val Gly Ile Phe Cys Ala Ile
     705                      710                  715                  720
     Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser Arg Ile
 35                      725                  730                  735
     Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg Gln Asn
                     740                  745                  750
     Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile Ser Phe
                     755                  760                  765
40   Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly Glu Ile
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     Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu Arg Gln
     785                      790                  795                  800
     Asp Val Ser Trp Phe Asp Asp Pro Lys Asn Thr Thr Gly Ala Leu Thr
 45                      805                  810                  815
     Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile Gly Ser
                     820                  825                  830
     Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr Gly Ile
                     835                  840                  845
50   Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu Leu Ala
                     850                  855                  860
     Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys Met Leu
     865                      870                  875                  880
     Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala Gly Lys
 55                      885                  890                  895
     Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser Leu Thr
                     900                  905                  .910
     Arg Glu Gln Lys Phe Glu Tyr Met Tyr Ala Gln Ser Leu Gln Val Pro
                     915                  920                  925
60   Tyr Arg Asn Ser Leu Arg Lys Ala His Ile Phe Gly Val Ser Phe Ser
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     Ile Thr Gln Ala Met Met Tyr Phe Ser Tyr Ala Gly Cys Phe Arg Phe
     945                    950                    955                    960
     Gly Ala Tyr Leu Val Ala Asn Glu Phe Met Asn Phe Gln Asp Val Leu
5                          965                    970                    975
     Leu Val Phe Ser Ala Ile Val Phe Gly Ala Met Ala Val Gly Gln Val
                         980                    985                    990
     Ser Ser Phe Ala Pro Asp Tyr Ala Lys Ala Lys Val Ser Ala Ala His
                 995                    1000                   1005
10   Val Ile Met Ile Ile Glu Lys Ser Pro Leu Ile Asp Ser Tyr Ser Pro
         1010                   1015                   1020
     His Gly Leu Lys Pro Asn Thr Leu Glu Gly Asn Val Thr Phe Asn Glu
     1025                   1030                   1035                   1040
     Val Val Phe Asn Tyr Pro Thr Arg Pro Asp Ile Pro Val Leu Gln Gly
15                          1045                   1050                   1055
     Leu Ser Leu Glu Val Lys Lys Gly Gln Thr Leu Ala Leu Val Gly Ser
                     1060                   1065                   1070
     Ser Gly Cys Gly Lys Ser Thr Val Val Gln Leu Leu Glu Arg Phe Tyr
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20   Asp Pro Leu Ala Gly Ser Val Leu Ile Asp Gly Lys Glu Ile Lys His
             1090                   1095                   1100
     Leu Asn Val Gln Trp Leu Arg Ala His Leu Gly Ile Val Ser Gln Glu
     1105                   1110                   1115                   1120
     Pro Ile Leu Phe Asp Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly Asp
25                          1125                   1130                   1135
     Asn Ser Arg Val Val Ser His Glu Glu Ile Met Gln Ala Ala Lys Glu
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     Ala Asn Ile His His Phe Ile Glu Thr Leu Pro Glu Lys Tyr Asn Thr
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30   Arg Val Gly Asp Lys Gly Thr Gln Leu Ser Gly Gly Gln Lys Gln Arg
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     Ile Ala Ile Ala Arg Ala Leu Val Arg Gln Pro His Ile Leu Leu Leu
     1185                   1190      ·        1195                   1200
     Asp Glu Ala Thr Ser Ala Leu Asp Thr Glu Ser Glu Lys Val Val Gln
35                          1205                   1210                   1215
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     His Arg Leu Ser Thr Ile Gln Asn Ala Asp Leu Ile Val Val Phe Gln
             1235                   1240                   1245
40   Asn Gly Lys Val Lys Glu His Gly Thr His Gln Gln Leu Leu Ala Gln
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55   Ser Thr Val Arg Asn Ala Asp Val Ile Ala Gly Phe Asp Asp Gly Val
              35                   40                   45
     Ile Val Glu Lys Gly Asn His Asp Glu Leu Met Lys Glu Lys Gly Ile
              50                   55                   60
     Tyr Phe Lys Leu Val Thr Met Gln Thr Arg Gly Asn Glu Ile Asp Leu
60    65                   70                   75                   80
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Glu Asn Ala Thr Gly Glu Ser Lys Ser Glu Ser Asp Ala Leu Glu Met
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Ser Pro Lys Asp Ser Gly Ser Ser Leu Ile Lys Arg Arg Ser Thr Arg
            100                 105                 110
Arg Ser Ile His Ala Pro Gln Gly Gln Asp Arg Lys Leu Gly Thr Lys
            115                 120                 125
Glu Asp Leu Asn Glu Asn Val Pro Pro Val Ser Phe Trp Arg Ile Leu
            130                 135                 140
Lys Leu Asn Ser Thr Glu Trp Pro Tyr Phe Val Gly Ile Phe Cys
145                 150                 155                 160
Ala Ile Ile Asn Gly Gly Leu Gln Pro Ala Phe Ser Ile Ile Phe Ser
                165                 170                 175
Arg Ile Ile Gly Ile Phe Thr Arg Asp Glu Asp Pro Glu Thr Lys Arg
                180                 185                 190
Gln Ile Ser Asn Met Phe Ser Val Leu Phe Leu Val Leu Gly Ile Ile
            195                 200                 205
Ser Phe Ile Thr Phe Phe Leu Gln Gly Phe Thr Phe Gly Lys Ala Gly
210                 215                 220
Glu Ile Leu Thr Lys Arg Leu Arg Tyr Met Val Phe Arg Ser Met Leu
225                 230                 235                 240
Arg Gln Asp Val Ser Trp Phe Asp Asp Leu Lys Asn Thr Thr Gly Ala
                245                 250                 255
Leu Thr Thr Arg Leu Ala Asn Asp Ala Ala Gln Val Lys Gly Ala Ile
                260                 265                 270
Gly Ser Arg Leu Ala Val Ile Thr Gln Asn Ile Ala Asn Leu Gly Thr
        275                 280                 285
Gly Ile Ile Ile Ser Leu Ile Tyr Gly Trp Gln Leu Thr Leu Leu Leu
        290                 295                 300
Leu Ala Ile Val Pro Ile Ile Ala Ile Ala Gly Val Val Glu Met Lys
305                 310                 315                 320
Met Leu Ser Gly Gln Ala Leu Lys Asp Lys Lys Glu Leu Glu Gly Ala
                325                 330                 335
Gly Lys Ile Ala Thr Glu Ala Ile Glu Asn Phe Arg Thr Val Val Ser
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Leu Thr Gln Glu Gln Lys Phe Glu His Met Tyr Ala Gln Ser Leu Gln
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